



## INTRODUCTION

In 1982, the Knox Soil and Water Conservation District (SWCD), in cooperation with the USDA, Soil Conservation Service (SCS) took part in the National Resources Inventory (NRI). Information was collected on 240 sample units to provide county reliable resource data.

This inventory provided natural resource data on (1) land use, (2) conservation treatment needs, (3) prime farmland, (4) potential cropland, (5) sheet and rill erosion, (6) flood prone areas, (7) wetlands, and (8) small bodies of water.

The study identifies erosion and land management problems in Knox County. These problems were addressed and priorities set in the District's long-range program. Top priorities include:

1. Reduce soil erosion on cropland, pastureland, and hayland where soil erosion is in excess of "T".
2. Reduce the loss of prime agricultural land in Knox County.
3. Improve the quality of Knox County woodlands.
4. Reduce soil and water related problems in cities, villages, and municipal areas in Knox County.
5. Improve wildlife habitat in Knox County.
6. Encourage conservation plans on oil and gas wells to control erosion.

This publication distributes the results of the Knox County Resources Inventory. The publication describes the soil resource base and highlights some problems that could reduce future soil productivity. Along with reduced production, off site damages could be expected. A primary objective of the Knox SWCD is to promote the wise use of the soil resource base in Knox County.

The information in this publication, like all information developed from a statistical study, has varying degrees of reliability or confidence levels. All values expressed here, representing over 10 percent of the county area, have a confidence level greater than 90 percent or they are at least 90 percent accurate. Smaller values, those representing less than 10 percent of the total county area, will be less than 90 percent accurate.

September 1985

## Land Use

Land area measurements were made for Knox County during the 1980 Census by the U.S. Department of Commerce.

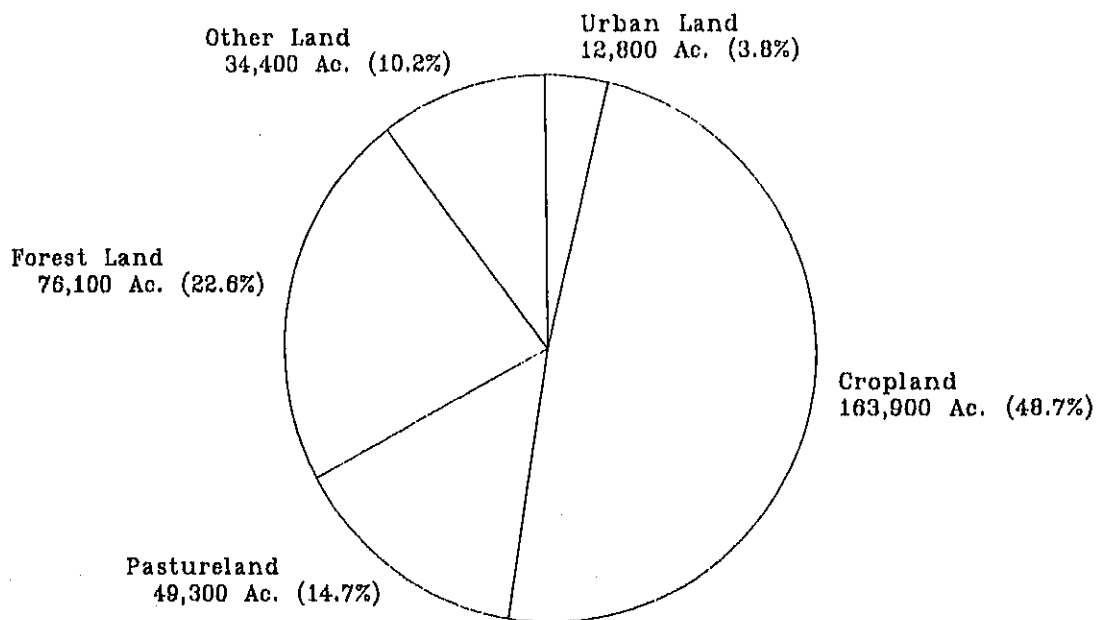
Table 1. Knox County Area Measurements

Nonfederal Land and Small Bodies of Water	336,500 Acres
Federal Land	1,100 Acres
Census Water (Large Bodies of Water)	1,200 Acres
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Total Surface Area	338,800 Acres

This report addresses only nonfederal land.

Figure 1.

## Knox County Land Use



TOTAL NONFEDERAL ACREAGE IN KNOX COUNTY = 336,500 ACRES

### KEY POINT:

- o Cropland is the largest land use in the county making up nearly one-half of the land area.

## Land Use by Capability Class

Soils can be classified in a number of ways. SCS uses a land capability classification system that groups soils on the basis of their ability to produce common cultivated crops and pasture plants without deterioration. Land capability classes and subclasses in Knox County are based on the soil survey.

Capability classes are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of agricultural use.

Class III soils have severe limitations that reduce the choice of agricultural use.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Each capability class except Class I has subclasses to identify specific limitations. The letter "e" stands for erosion risk; "w" for wetness; and "s" for soils limited mainly because they are shallow, droughty, or stony.

Table 2. Rural Nonfederal Land Use Acreage by Capability Class

CLASS	CROPLAND Acres	PASTURELAND Acres	FOREST LAND Acres	OTHER LAND Rural Acres	TOTAL
I	6,000	0	400	0	6,400
II	99,000	22,400	25,200	10,100	156,700
III	46,500	12,700	21,000	6,000	86,200
IV	10,000	10,500	14,600	1,900	37,000
V	900	0	400	0	1,300
VI	1,500	3,200	11,200	500	16,400
VII	0	500	3,300	0	3,800
NA*	0	0	0	4,400	4,400
TOTAL	163,900	49,300	76,100	22,900	312,200

\*Urban strip buildup in rural area.

KEY POINTS:

- o Eighty-nine percent of all cropland is on Classes II and III.
- o Seventy-two percent of Classes VI and VII is in forest land.

### Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short and long range needs for food and fiber. Prime farmland soils are defined as the soils that are best suited to producing food, fiber, forage, feed, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland is also the easiest and least costly to develop for non-agricultural uses. Urbanization and other land uses have the potential to consume significant areas of prime farmland. Decisions need to be made at the local level to encourage wise use of agricultural lands.

Knox County has about 146,200 acres of prime farmland with all of it in Capability Classes I, II and III.

Table 3. Prime Farmland by Rural Nonfederal Land Use

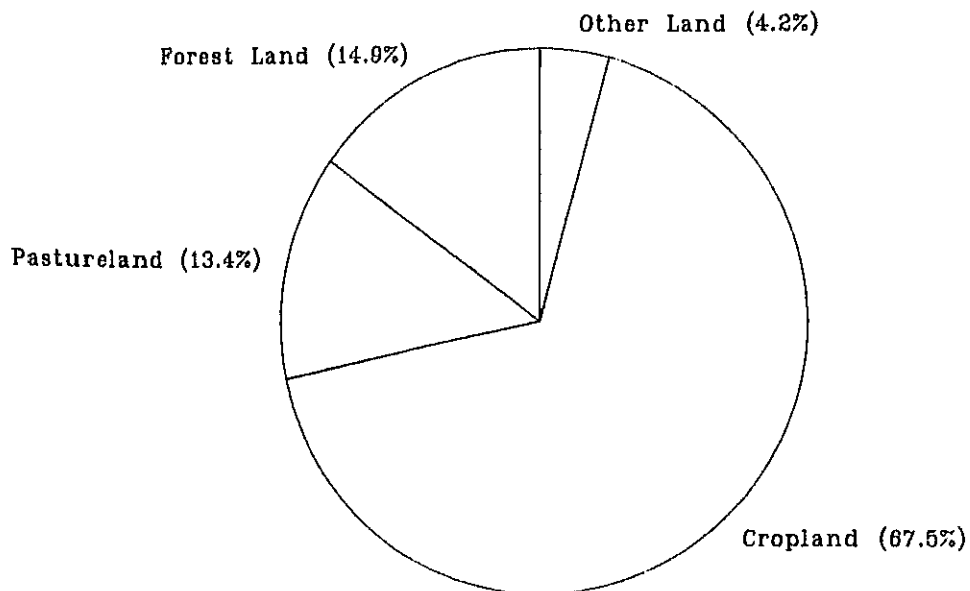
LAND USE	TOTAL ACRES	PRIME FARMLAND	
		Acres	Percent
Cropland	163,900	98,700	60
Pastureland	49,300	19,600	40
Forest Land	76,100	21,800	29
Other Land	22,900	6,100	27
TOTAL	312,200	146,200	47

Most of the prime farmland in the county is currently cropland. Figure 2 illustrates the uses of prime farmland.

Figure 2.

# Use Of Prime Farmland

Knox County



## Soil Erosion

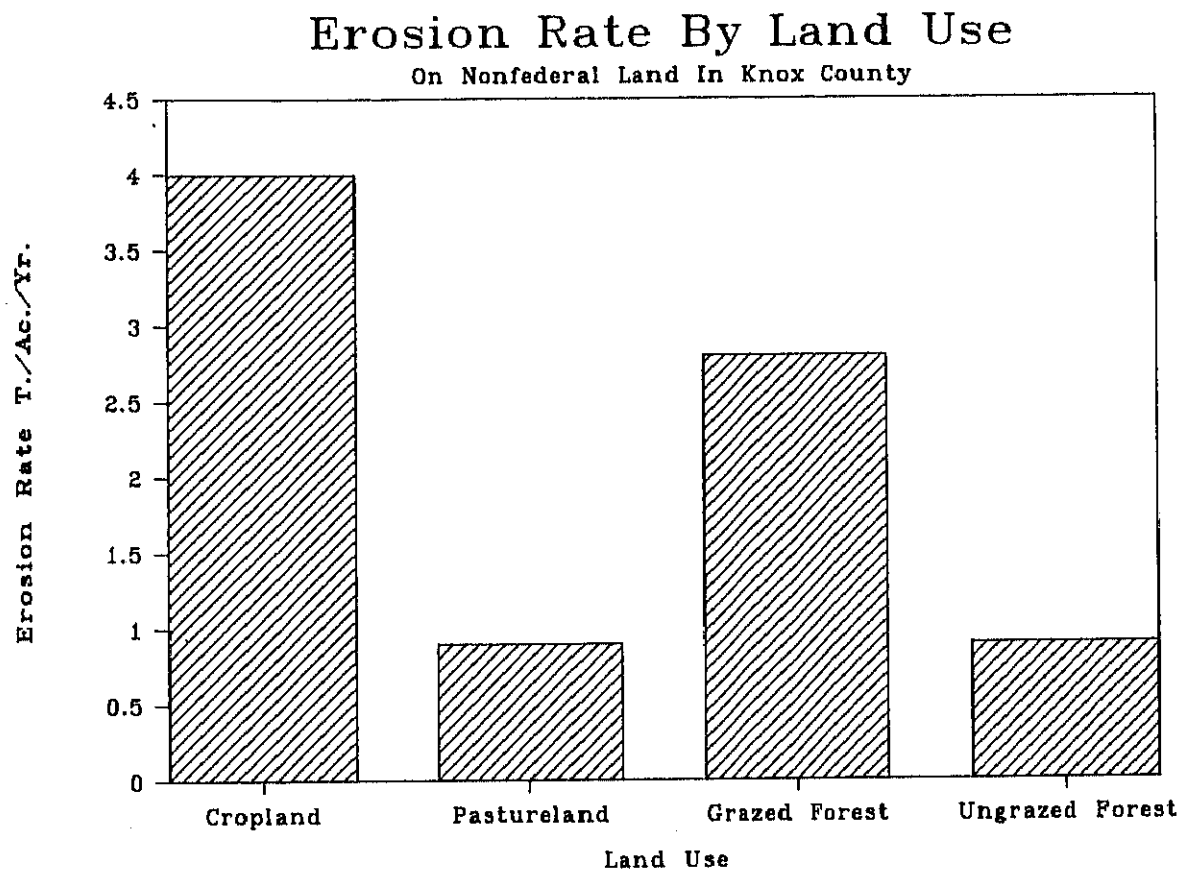
Soil erosion is a continuously occurring natural process that loosens and transports soil particles. Erosion occurs slowly on undisturbed forest land and areas with adequate permanent vegetative cover. Soil losses are quite high on sloping cropland that is continually cultivated and left unprotected during several months every year.

Over 779 thousand tons of topsoil erode on Knox County agricultural land annually. Over 83 percent of the erosion is on cropland.

Table 4. Annual Soil Erosion by Agricultural Land Use on Nonfederal Land

LAND USE	ACRES	TONS	TONS/ACRE
Cropland	163,900	649,900	4.0
Pastureland	49,300	46,100	0.9
Grazed Forest Land	8,700	23,900	2.8
Ungrazed Forest Land	67,400	59,400	0.9
TOTAL	289,300	779,300	
AVERAGE			2.7

Figure 3.



**KEY POINTS:**

- o The average cropland erosion rate is nearly four tons per acre per year in Knox County.
- o Cropland erosion would be much higher if no-till farming was not practiced in Knox County on a large scale.



Table 5. Erosion on Nonfederal Cropland by Capability Class and Subclass

CLASS AND SUBCLASS	ACRES	TONS	TONS/ACRE
I	6,000	6,800	1.1
IIe	71,300	275,000	3.9
IIw	24,400	34,200	1.4
IIs	3,300	2,400	0.7
IIIe	43,200	263,400	6.1
IIIw	3,300	4,000	1.2
IVe	10,000	44,800	4.5
V	900	3,000	3.3
VIe	1,500	16,300	10.9
TOTAL	163,900	649,900	
AVERAGE			4.0

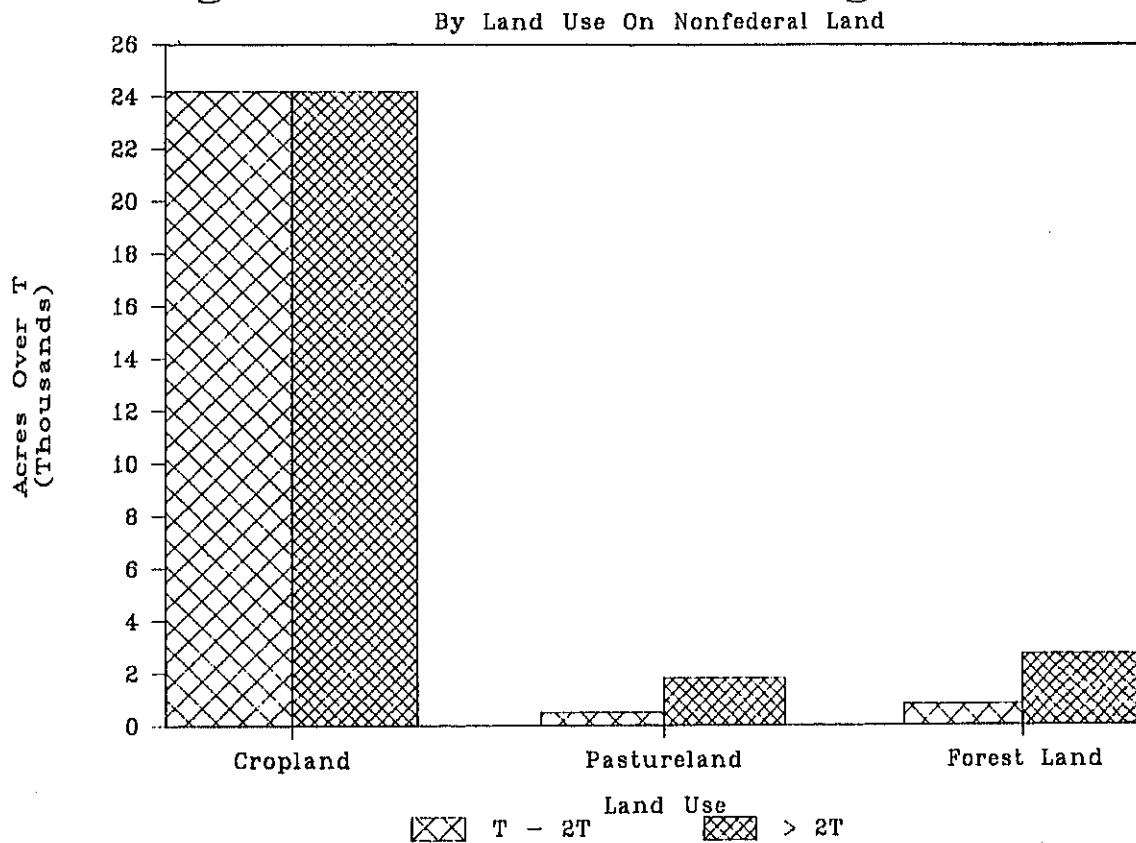
KEY POINTS:

- o Over eighty-three percent of all cropland erosion is on IIe and IIIe soils.
- o IVe and VIe soils account for only 9 percent of soil erosion on cropland in Knox county.

Soil can tolerate small amounts of erosion and remain productive for agriculture. When erosion is above this tolerable limit, the soil resource base cannot be maintained and the future ability of the soil to produce crops is threatened. The tolerable soil loss ("T") ranges from three to five tons per acre per year, with most of the soils in Knox County having a "T" of four.

Over 54,000 acres are eroding at rates greater than "T". There are 28,900 acres in the county eroding at rates greater than two times "T". These acres represent a serious threat to the productive capacity of the soil resource base.

Figure 4. Agricultural Land Eroding Over "T"



KEY POINTS:

- o 48,600 acres of cropland are eroding over "T".
- o 24,400 acres of cropland are eroding over "2T".

Cropland is located on the better soils in the county (see Tables 2 and 3). About one out of every three of these highly productive cropland acres is eroding excessively.

Table 6. Nonfederal Cropland in Relation to "T"  
by Capability Class and Subclass

CAPABILITY CLASS	TOTAL	LESS THAN "T"	"T" - "2T"	GREATER THAN "2T"
-----ACRES-----				
I	6,000	6,000	0	0
IIe	71,300	45,900	15,400	10,000
IIw	24,400	22,400	1,500	500
IIs	3,300	3,300	0	0
IIIe	43,200	25,700	6,100	11,400
IIIw	3,300	3,300	0	0
IVe	10,000	6,800	1,200	2,000
V	900	900	0	0
VIe	1,500	1,000	0	500
TOTAL	163,900	115,300	24,200	24,400

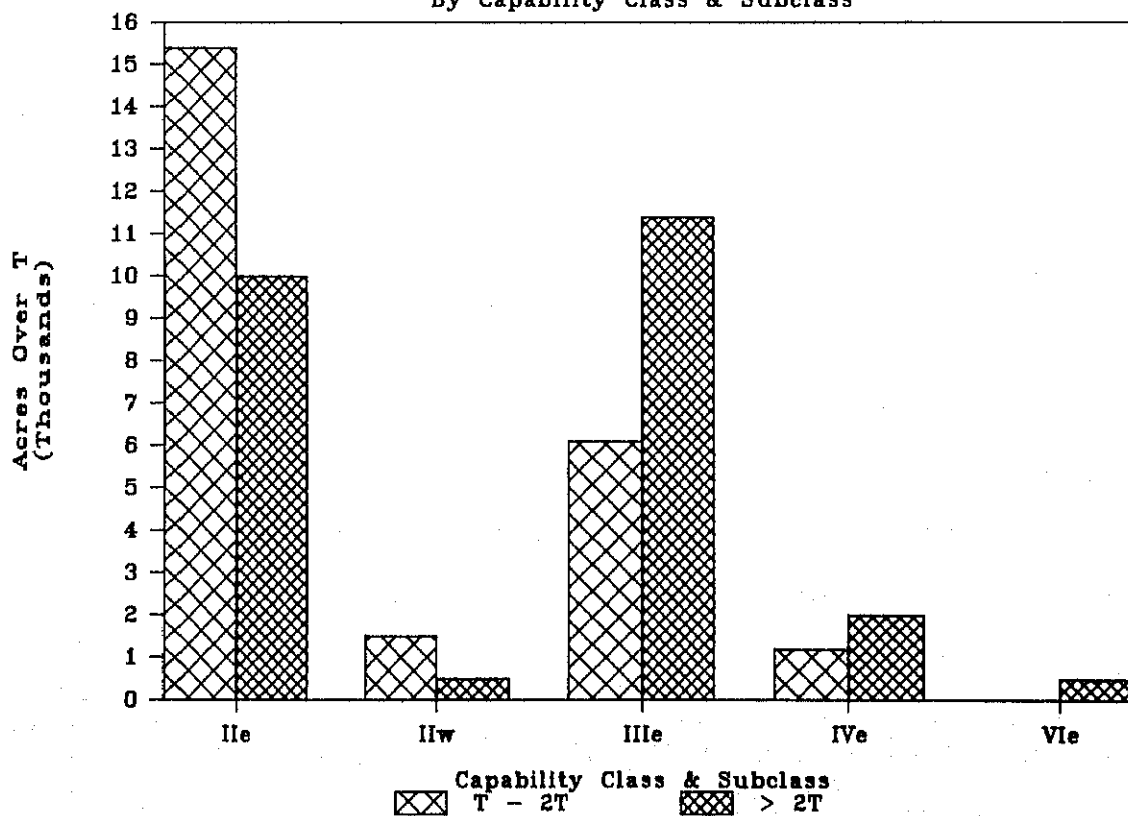
KEY POINTS:

- o Thirty percent of all cropland is eroding over "T".
- o Fifteen percent of all cropland is eroding over "2T".

Figure 5.

### Cropland Eroding Over "T"

By Capability Class & Subclass



### Conservation Treatment Needs

Many acres of Knox County agricultural land need one or more different types of conservation treatment to either protect or improve soil and water resources. The different conservation practices used to accomplish these objectives vary by land use.

Cropland treatment usually involves practices like conservation cropping systems, conservation tillage, contour farming, contour stripcropping, terraces and subsurface drainage systems. Pastureland practices include rotational grazing, pasture management and pasture planting. These practices may be used to protect or improve soil, water and plant resources. Conservation practices needed on forest land may include livestock exclusion, timber stand improvement and tree planting. Land designated as adequately protected is properly managed for production and protected from excessive erosion.

Table 7. Conservation Treatment Needs and Percent by Land Use on Nonfederal Land

LAND USE	TOTAL ACRES	TOTAL ACRES NEEDING TREATMENT	% TOTAL ACRES NEEDING TREATMENT
Cropland	163,900	94,300	58
Pastureland	49,300	31,000	63
Forest Land	76,100	62,100	82
Other Land	22,900	5,200	23
TOTAL	312,200	192,600	62

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### SUMMARY

Agriculture accounts for about 86 percent of Knox County land use. Prime farmland makes up about 43 percent of the county. Sixty percent of the cropland in Knox County is considered prime farmland.

Serious erosion occurs on both prime farmland and nonprime farmland. Over 48 thousand acres of cropland are eroding excessively. It would be much worse if no-till farming was not practiced on a large scale in the county.

Over 192,000 acres of Knox County land needs one or more different types of conservation treatment in order to either protect or improve the soil and water resources.

